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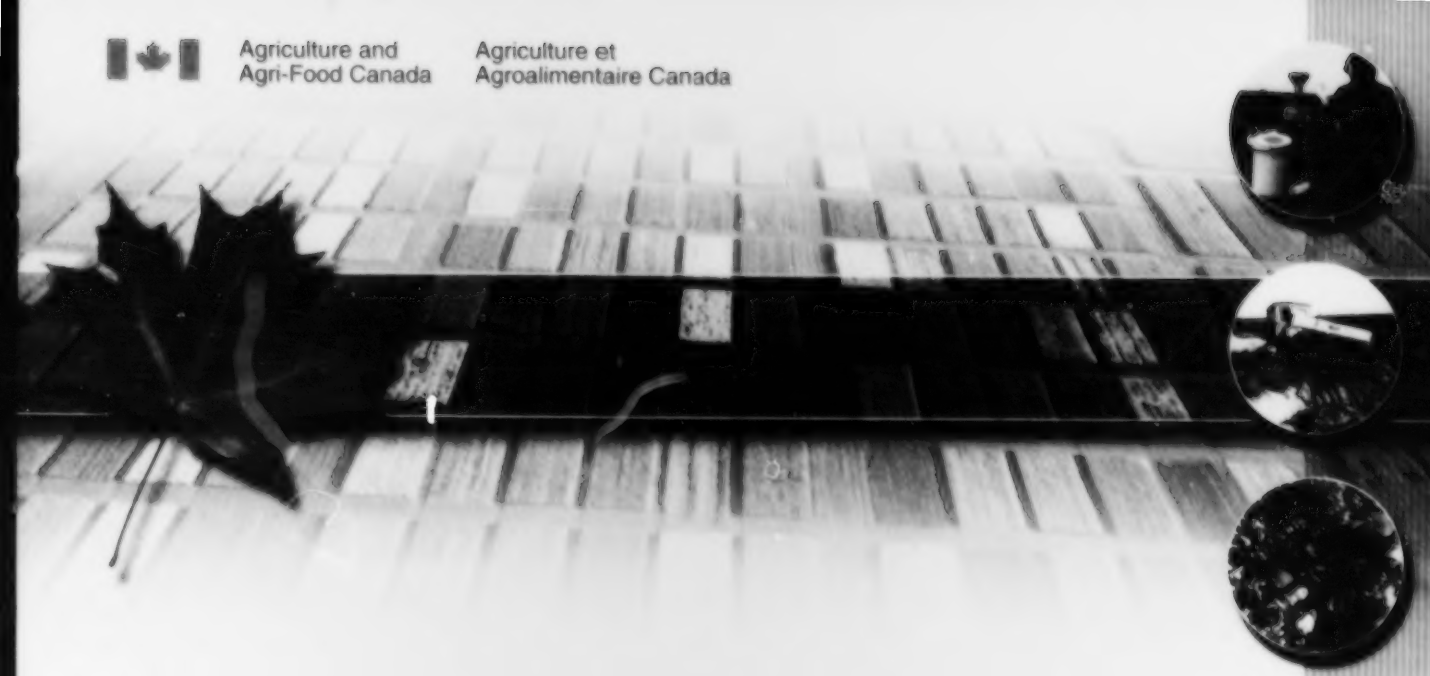


Scott Research Farm

1910 - 2010

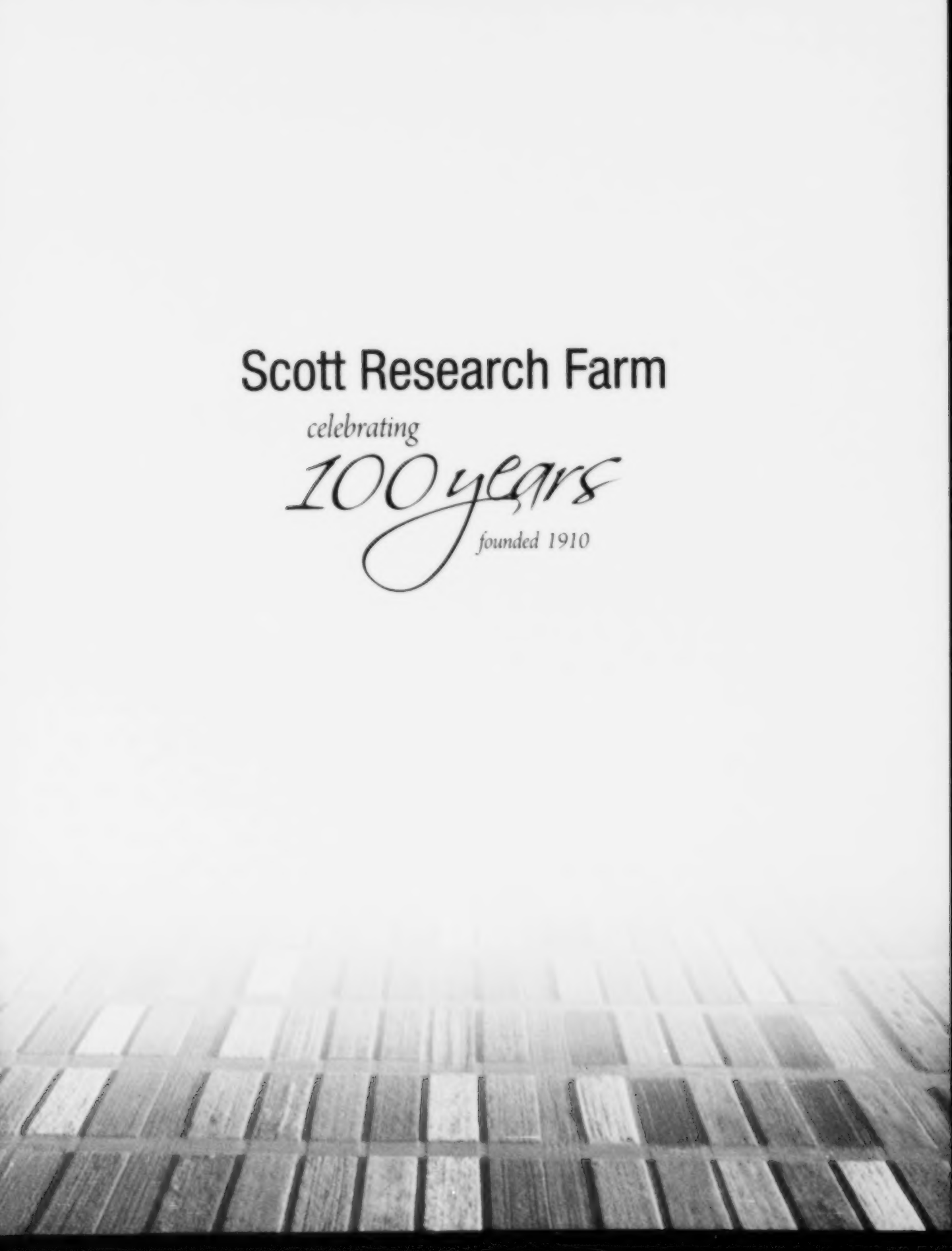
Canada

Scott Research Farm

celebrating

100 years

founded 1910



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Foreword

In 1886, the Experimental Farm Stations Act was passed to establish five experimental farms in Canada, and so began the Dominion experimental farms service. By 1887, the initial five farms had been established. Early in the nineteenth century, the need for further experimental stations was recognized, and six new experimental stations were established between 1906 and 1911. One of the new experimental stations was at Scott, Saskatchewan. This station was to serve western Saskatchewan from the South Saskatchewan River to the forest of the north as well as a portion of northeastern Alberta.

"Service to the Canadian Farmer" was the motto and sole aim of the experimental farms and stations. At Scott, initial emphasis was on helping settlers to adapt to the soils and climate of the region. Many settlers had little or no previous farming experience or had farmed under very different conditions. After settlement, emphasis shifted to improving crops and livestock and their husbandry, as well as improving farmsteads. As new problems and opportunities arose, related to soil quality, availability of inputs, low commodity prices, alternative crops, biotechnology and organic farming, the farm adapted and changed. During this period it went through several name changes - from the Scott Experimental Station, then the Scott Experimental Farm and finally the Scott Research Farm.

Over the past 100 years, the continued focus on service to farmers has served the region rather well. Evidence of this success comes by way of numerous accomplishments at the farm, by national and international recognition, and by the fact that the farm has survived to celebrate its 100th anniversary.

The aim of this publication is to provide a brief account of the 100-year history of the Scott Research Farm. To do so I have relied heavily on the 75-year history book published in 1986 by Ken Kirkland with the assistance of Charley Keys and Don Dabbs. The excellence of their earlier work made this publication possible. I would also like to acknowledge the important contributions made by Eric Johnson and Dan Ulrich to the modern era account of the weed management and minor use programs.

Throughout this publication I have attempted to associate names of scientists with the work they led. This is possible because these names can be associated with numerous reports and publications. However, this should not overshadow the contributions of the many technical and support staff who served the farm over the past 100 years. The success of the farm reflects the initiative, dedication, and creativity of the staff who built on past accomplishments while adapting to new challenges. Our staff continues to be our most valuable asset.

While this publication is about Scott, it should be emphasized that the farm has always functioned as part of a well coordinated national network of sites. Thus accomplishments at Scott also reflect the collaborative accomplishments of Agriculture and Agri-Food Canada as a whole.

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Research Scientist, Retired
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Chapter One: Early Agriculture and the Experimental Station

The movement of settlers to the northwestern portion of the prairies and into the parkland belt shortly after the turn of the century brought new challenges; therefore, the Department of Agriculture's Experimental Farms Service recognized the need for further expansion into the new area.

The original site of the experimental station (1910) lies immediately south and west of the town of Scott and south of the main line of the Grand Trunk Pacific Railway (now Canadian National Railway) in Township 30, Range 20, West of the 3rd Meridian.

The site was selected by Mr. Duncan Anderson and was subsequently visited and approved by Dr. William Saunders, director of the Central Experimental Farm, and other officials. It was purchased by the Dominion Government in the spring of 1910 and Anderson began work immediately on the initial stages of development as the officer-in-charge. Mr. Norman Davies became the farm foreman. Plans, developed in Ottawa, were used in laying out the grounds and building sites. Construction of the superintendent's dwelling (including office space) and a stable-carriage building were begun immediately. A well was dug near the dwelling to supply water for the whole unit.

It is interesting to read the following extracts of Anderson's report to the Director, as included in the experimental farm report, March 31, 1911:

> *This farm is situated on the main line of the Grand Trunk Pacific Railway, close to the Town of Scott. The town has a population of about 600, and is 103 miles west of Saskatoon, and 233 miles east of Edmonton. Scott is the center of a large area of splendid grain growing country. The famous Tramping Lake region lies directly south and the well-known Cut Knife section to the north and west. The farm consists of 198.5 acres, and is bounded on the east by the main travelled road leading into the well settled Tramping Lake District, on the north by the railway, and on the south and west by the division line. The surface of the farm is undulating, open prairie, unbroken by either bush or sloughs. One or two small pot-holes, and here and there a few stones can be seen.*

Farming began on May 16, 1910, with 43 ha (105 ac) broken that year. It is interesting also to note the cost of the breaking as summarized in the annual report:

Breaking	$9.27/ha (3.75/ac)
Packing	$0.62/ha (0.25/ac)
Backsetting	$9.27/ha (3.75/ac)
Single Discing	$1.24/ha (0.50/ac)
Double Harrowing	$1.24/ha (0.50/ac)
Total Cost	**$21.64/ha (8.75/ac)**

The area to be served by the Scott Experimental Farm included all agricultural land in Saskatchewan north of the

Superintendent's dwelling and stable-carriage building (1912).

First sod breaking (1910).

South Saskatchewan River and west of Range 5, West of the 3rd Meridian. In addition, a small area of east-central Alberta was included as Scott territory.

On March 1, 1911, the first Superintendent, Mr. R.E. Everest, was appointed. In that year testing of cereal varieties (oats and wheat only), rates of seeding, depths of seeding (oats only) and growing of mixed cereals and legumes (oats and peas or barley and peas) for feed were started. Some crop rotations were established and one of these, "Rotation C," has been continued on the same land area to the present time. Horticulture took a prominent place from the outset. An orchard was established with a number of varieties of apples, as well as currants, gooseberries and strawberries. Vegetables and flowers were tested for adaptation. Seventeen cultivars of potatoes were tested.

More land was acquired over time, and by 1950, the farm consisted of 465 ha (1150 ac) of crown and about 190 ha (470 ac) of leased/rented land. Since that time the land base at Scott has decreased to 338 ha (834 ac) of crown land in 2010.

A dam to supply water for livestock and irrigation was constructed in 1948. Spring runoff in 1949 and a fault in the way soil was compacted in the construction of the dam caused it to fail; it was rebuilt in 1950. Of interest was the detailed documentation on the process of the dam leakage and ultimate failure. This information has been used to stress the importance of adequate, uniform soil compaction in several engineering reference books on construction of earthen dams.

Construction of new buildings continued until about 1950. At that time, there were nine dwellings including a boarding house and a bunk house on site plus six livestock barns and sheds. Other buildings included the office, an elevator and seed cleaning plant, a greenhouse, a workshop, a threshing barn, plus six other storage buildings. Since that time, building construction was mostly related to replacement of old buildings that had outlived their usefulness. In 1988, a multi-purpose building that houses offices, laboratories and a maintenance shop was completed and has remained highly functional to the present. The old office, horse barn (which was used for laboratory space), the soils building and greenhouse all became redundant after the construction of the new building and were removed. In 2005, the superintendent's house – which first greeted visitors to the farm but had sat empty for more than five years – was sold and moved from the farm.

W.J. Wright, Ottawa, examining "Rotation C" which was established in 1911.

First orchards and shelterbelts established.

Chapter Two: The Early Years, 1910-1930

Meteorological records including data on high and low temperatures, hours of sunshine and precipitation were started in May, 1911.

From the outset it was recognized that climatic conditions tended to be more severe at Scott than at the experimental stations in the southern part of the prairies. Late spring and early fall frosts, coupled with limited moisture, created conditions that limited crop selection as well as production. Marquis wheat, introduced into Saskatchewan in 1907, was the standard cultivar at Scott. Testing of winter wheat started in the fall of 1911, but it was not a success. Many of the cultivars of field crops, and practically all horticultural crops, were ones adapted to eastern Canada but because conditions on the prairies were quite different, there were numerous failures.

Through Everest's superintendence (1911-1914), the emphasis appeared to be on systems of soil management, from breaking the sod to the production of crops thereon. The first feeding trials of beef cattle were conducted during the winter of 1913-1914. The production of a wide range of crops was tried with the idea of using them as livestock feeds, i.e., turnips, mangels, field carrots, corn, sunflowers, as well as other types of forage crops. There was also considerable work in extension. The superintendent acted as a judge of country fairs in 1912 at Outlook, Brooks, Zealandia, Kindersley, Luseland, Brownlee and Hanley. There were also more than 700 visitors at the station during that year, mostly during the summer. The interest developed in horticultural crops led to the appointment of Mr. H.C. Love as gardener in 1912. This was the year that the arboretum and the specimen hedges were started and some of these are still present today.

In 1914, Everest took leave of absence to join the Armed Forces in World War I and Mr. M.J. Tinline was appointed as acting superintendent. A further half section of land, the south half of 17-29-20 W 3, was purchased to expand the field work and to be developed for livestock production research. Forty-one hectares (100 ac) were broken that year and a foreman's cottage was also built. The going rate for labour was 19 cents per hour and wheat was worth 33 dollars / tonne (90 cents / bu).

During the years of World War I, expansion was slow because of financial and manpower resource limitations. In 1915, the dominion horticulturist, W.T. Macoun, made the following statement regarding Scott "Considering the few years this station has been established, the development in horticulture has been very great. A few crabapple trees are already fruiting. Horticulture at this station is already attracting much attention in the district."

Extension was a very necessary function in getting information out to the farmer. Scott Experimental Station's exhibit at seven local fairs attracted about 5,000 visitors and an additional 2,524 people visited the station itself.

The fall of 1915 marked the introduction of livestock (other than work horses) to the program conducted at Scott. A flock of 100 range ewes was purchased for the purpose of upgrading with purebred sires. Economics were

Feeding trials of beef cattle (1913-1914).

Arboretums and specimen hedges established in 1912.

also included in the program. The year also marked the introduction of cattalo, including some hybrid buffalo, to the station. The latter venture lasted only a little more than a year as the station was not equipped to handle this type of animal. The fences and corrals were simply not adequate, and the animals were moved to the Wainwright Buffalo Park in December 1916 where studies of buffalo and domestic cattle cross breeding were continued.

The tough winter of 1915-16 resulted in a high degree of winterkill in the orchard, perennial flower borders and shrubbery plantings. The summer of 1916, however, was long remembered for its abundance of moisture and excellent crop production. Banner oats yielded 1.73 tonne/ha (112 bu./ac) while Marquis wheat yielded 0.46 tonne/ha (42 bu./ac).

Poultry were brought into the program at the station in 1917. Pullets and 2-year old hens were compared for egg production, egg fertility and chick hatchability. The work also compared types of incubators, methods of brooding, as well as feeds and rations for laying hens, fattening poultry and growing chicks.

Experiments on feeding steers included the assessment of economics of winter fattening, dehorned versus hornless animals, straw shelter versus corral feeding and sunflower silage versus dry feeding.

The animals were purchased in the fall and marketed in the spring. Work with cattle was at first limited to winter feeding of steers, but a breeding program of purebred dual-purpose Shorthorns was initiated in 1921 when these cattle first became available. Five heifers and a young bull from Indian Head, Saskatchewan, constituted the original breeding herd.

The work with animals also involved cross-breeding of sheep to improve the wool quantity and quality of the basic range type of animal. Feeding trials with lambs were also conducted to assess the values of various crops and by-products that were produced locally, that is, cereal straw, grain screenings, forage crops, silage and some root crops. Cross-breeding of swine (Yorkshire, Berkshire and Duroc) was started to assess the various crosses for their efficiency and quality of pork production.

The livestock and poultry work was developed to provide information to farmers who were trying to develop an industry that, in many instances, was alien to them.

Experimental work with soil and crop management followed similar patterns. There was much to be learned about the manipulation of the different soil types and the response of the various crops to them, keeping in mind the severe climatic conditions that prevailed throughout the area.

After a decade of operation, which included the period of World War I, a second professional staff position was established and Mr. Elmer Van Nice assumed the position of assistant to the superintendent in early 1921. This marked the first of several new professional staff positions that were to be created at later dates.

In addition to the introduction of a small herd of purebred Shorthorn cattle in 1921, a Percheron Horse Breeders Association was formed in the district, with government

Early field days at the station attracted large crowds.

Cattalo introduced to the Scott Station (1915).

assistance. This, along with the purebred sheep, hogs and poultry, was the basis for promoting livestock improvement in the area. Similar procedures were followed in field crops. Pure seed of the most promising cultivars was increased and sold to farmers and supplied to illustration stations for further increase and distribution.

At the same time, experiments were conducted to determine the most efficient crop rotations, crop sequences, and the best tillage operations for use on summerfallow and stubble land. These studies were conducted on plots of 100 square metres (1/40 ac) or small fields of 0.4 ha (1 ac) each.

To carry out the wide range of tasks that were required in the livestock, field crops and horticultural programs, the superintendent and his assistant were supported by a number of year-round and seasonal employees under the supervision of the "farm foreman." Some of these employees specialized in certain areas of work. Frank Rouse (1920-1951) was in charge of poultry; James Allaway (1921-1943) horticulture; Lorne Wilson, cereal and forage plots; George Prost (1921-1961) field crops and tillage; and Alex McCallum was livestock herdsman.

In 1924, Tinline was transferred to Brandon and Mr. Victor Matthews was appointed as superintendent.

A third professional, Mr. Francis M. MacIsaac, joined the staff in 1924, but it was not until 1928 that MacIsaac, better known as "Mac," was appointed as an assistant to the superintendent. Those years (1924-28) marked the beginning of "departmentalization" or specialization at the farm level. Van Nice was responsible for animal husbandry, MacIsaac assumed the responsibility for field husbandry, while the superintendent looked after horticulture in addition to his administrative duties.

Further staff changes in 1928 saw Mr. G.D. Matthews appointed as superintendent following the sudden death of his brother Victor. In the fall of the same year, Mr. N.F. Bell arrived at Scott to assume responsibility for supervising the illustration stations located in northern Saskatchewan and in a small area of northeastern Alberta. Up to this point, the illustration stations in Saskatchewan had been supervised by Mr. Edward Sackville out of the Swift Current Experimental Station.

During this era, field days or "excursions" as they were known at the time were the main method for disseminating information. On July 15, 1925 over 2000 farmers attended a Grain Growers day at the farm. This number was dwarfed on August 8, 1927 when over ten thousand attended a joint picnic sponsored by the Grain Growers of Canada and the Wheat Pool.

Evaluating early introductions of cereal cultivars.

Gardener James Allaway evaluating a white lilac selection.

Chapter Three: Illustration Stations

An "Illustration Station Division" was established as a new division of the Central Experimental Farm in Ottawa in 1915. Under its terms of reference, it was responsible for the coordination and supervision of demonstrations carried out with selected farm co-operators throughout the various agricultural areas of Canada. The selected farmers agreed to carry out practices being recommended for the area, and to demonstrate the production of new crops that were made available to them. Livestock production improvement, as well as farmstead planning and beautification were also a part of the activities of an illustration station operator.

In the first year of activity, Mr. John Fixter, the supervisor in Ottawa, established a unit in the Kindersley district, near Madison, on the farm of the Halpenny brothers. Later in the same year, farms operated by Dr. S.E. Shaw at Biggar and Mr. Hugh Hill at Lloydminster were approved, with work to begin the following year. In 1918, a station was established at Meota on the farm of Mr. Walter Tait. In 1919, a site at Zealandia was selected on the farm of Mr. W.A. Roberts.

From 1915 to 1921, 89 illustration stations were in operation in Canada and all were supervised from Ottawa. In 1922, it was decided to transfer some of the responsibility of planning and supervising the work on illustration stations to supervisors who would be located at selected experimental farms or stations across the country. In Saskatchewan, the work was supervised from Swift Current by Sackville. There were 15 stations throughout the province at the time. In Alberta, it was interesting to note that the supervisor for that province was Everest, who had been the first superintendent at Scott. This form of organization remained in place until 1928 when Saskatchewan was split into two supervisory areas. The southern portion of the agricultural area remained under the supervision of Sackville at Swift Current. The new northern area included the northern agricultural area of Saskatchewan, plus a narrow strip on the eastern side of Alberta next to the provincial boundary, and as far south as the South Saskatchewan River. The Scott Experimental Station was to be the headquarters for this new district.

Although the illustration station supervisors were located at the various experimental farms and stations, their positions were actually attached to the Central Experimental Farm in Ottawa. This also applied to the funding of illustration stations and supervisors. Reports were directed to the chief supervisor in Ottawa through the experimental station superintendent.

When Mr. N.F. Bell, who had been appointed as supervisor of illustration stations for northern Saskatchewan, arrived at Scott to take up his duties in the fall of 1928, the Superintendent and staff at Scott knew nothing about the whole arrangement. Consequently, Bell was sent to Swift Current to become acquainted with his new duties and become familiar with the illustration stations that were to be transferred to his district of supervision.

Illustration station supervisors and operators in conference at Scott (1929). Standing (left to right): C.H. Snider, Guernsey; R. Simpson, Kindersley; H. Hill, Lloydminster; J. Moynon, Supervisor, Ottawa; W. Tait, Meota; H. Therrien, St. Paul, Alberta. Seated (left to right): F. Macintyre, Meanook, Alberta; J. Grant, Glenbush; N. Bell, Supervisor, Scott.

The drought and depression of the 1930s resulted in the introduction of the Prairie Farm Rehabilitation Act (PFRA) in 1935.

Responsibility for the illustration stations located at Guernsey, Kindersley, Lloydminster, Loverna, Marcelin, Meadow Lake, Meota and Spruce Lake was transferred to Scott. Responsibility was also accepted from the Manitoba area for a station at Tisdale and, from the Alberta area, a station at St. Paul, Alberta.

Within a 5-year period of activity, Bell had nearly doubled the number of illustration stations operating within his district. This district of some 453,250 square kilometers (175,000 square miles) had within it large areas of semi-arid prairie, parkland and wooded regions. Ofnecessity, a large number of projects were carried. Some of these were common to all stations (e.g., cereal cultivar evaluation), whereas others were established to meet special problems (e.g., alfalfa seed production). During this same period, drought and soil drifting, accompanied by grasshopper and wheat-stem sawfly infestations, created severeproduction problems in the prairie areas of the district. Inaddition, extremely low prices for all farm products throughout the entire country created a depression that has since been referred to as the "Dirty Thirties."

The drought and the depression put a severe strain on the experimental stations and illustration stations, as answers to the immediate problems were needed desperately. In 1935, the federal government brought into effect the Prairie Farm Rehabilitation Act (PFRA). The effect of this act was to convert the illustration stations within the designated PFRA area into "District Experiment Sub-Stations." The units within the Scott area of supervision were located at Consort and Metiskow in Alberta, and Dunblane, Guernsey, Juniata, Kindersley, Loverna and Rosetown in Saskatchewan. They became focal points in the struggle to combat the effects of continual drought. These units were specially funded so that more detailed work could be initiated in relation to soil drifting control, soil management and crop residues, moisture conservation, cropping systems and numerous other applicable projects, such as grasshopper and sawfly control. As results became available, they were passed on to farmers in the surrounding districts by means of field days, press articles and printed bulletins.

During the 1930s, the demand for illustration stations in the area far exceeded the manpower and money available to supervise and operate them. At the outset, the experiments and demonstrations were conducted on large plots or small fields, some of them as large as 1.6 ha (4 ac), with the operators performing most of the work. It became apparent that a lot more information could be obtained from smaller plots, with the supervisor and support help doing the work, using portable equipment. This gradually became the accepted procedure and the operators were mainly responsible for land preparation and post-harvest cleanup. By 1938, the program had expanded to 19 illustration stations and eight experimental sub-stations. It was at this stage that a second supervisor, Mr. R.H. (Bob) Anderson, was appointed. After two years of working as a team with Bell, it was decided the territory should be split. Anderson moved his headquarters to Melfort in 1940 and assumed responsibility for the illustration stations and the experimental sub-stations that were located east of the 3rd Meridian, except for the stations located at Hafford and Parkside, which were included in the Melfort area. Bell continued to look after the Stations in northwestern Saskatchewan and a small area of northeastern Alberta.

Field Day at the Glaslyn Illustration station (1935).

Thousands of kilometres of shelterbelts were planted as part of the PFRA program to help reclaim land that had been severely eroded during the dirty thirties.

Commercial fertilizers were developed in the mid-thirties and the northwestern Saskatchewan illustration stations and experimental sub-stations were ideal locations for soil fertility studies since they were located in all of the major soil zones, and represented a number of soil types within a zone. These studies stimulated a great deal of interest in the various districts, particularly in the northern areas where the lack of fertility became a real problem a few years after the land was broken. As the farming areas aged, the maintenance of soil fertility continued to be an important area of research.

Following 1937, the worst of the drought years, production and the general economic conditions throughout the area improved. A large number of people moved into the far north area from prairie cities and southern farms. As well, settlers were still being brought in from other countries by government and the colonization branches of large land holders such as the CNR, CPR and the Hudson's Bay Company. Many of these people had no previous agricultural experience, while others applied their prairie experience to the north without success. The illustration stations at Glaslyn, Glenbush, Meadow Lake, North Makwa and Pierceland in Saskatchewan, and at Meanook and St. Paul in Alberta, played a significant part in the development of those isolated areas of settlement. It was necessary to provide many of these new farmers with much basic information on what crops to grow, how to grow them, what types of equipment were most suitable, as well as on the improvement and care of farm livestock.

Holding field days at the illustration stations was one of the main ways of disseminating information. People could see the crops being grown and the effects of fertilizer. They could see the value of cultivated grasses and legumes for improving forage and pastures, and further see the benefits of better livestock selections and management. It should also be noted that a number of people had great difficulty with the English language. However, they could still appreciate the value of what the newer crops and methods of production being demonstrated could do for them. Field days at illustration stations and experimental sub-stations allowed people to see the progress being made in the main facets of agriculture at a time when travel, for many people, was largely limited to the community in which they lived. Bell worked very hard, particularly during the years of World War II, when physical and financial help was extremely limited and at a time when many people in these northern areas were struggling simply to survive.

In 1944, Bell resigned from his position as supervisor and it was not until September 1945 that the position was refilled by Mr. C.H. Keys, who had just been discharged from the RCAF. By the time he arrived on the job the number of stations had declined to the five units located at Glenbush, Kindersley, Loverna, North Makwa and Rosetown. Immediate action was taken to locate some new sites. By the time winter set in, two new locations had been approved; one at Conquest and one at Glaslyn. The Conquest Station was in the centre of a field shelterbelt area. Thousands of

The application of fertilizers was investigated extensively during the thirties.

The illustration station established on the R. Kisling farm at Loon Lake to investigate problems associated with Gray-Wooded soils operated until 2006.

hectares had been planted to shelterbelts as part of the PFRA program to help reclaim land that had been severely eroded during the Dirty Thirties. Studies on the influence of these shelterbelts on crop production were to be conducted there. The station at Glaslyn was on a strongly degraded Gray-Black soil in an area that was prone to late spring and early fall frosts.

The chief supervisor and staff in Ottawa encouraged the establishment of new units on the basis of need to address specific problems. There was also encouragement for greater emphasis on projects that would generate new information. Plots were to be set up in such a way that the data could be analyzed statistically and published, as well as serving a demonstration purpose.

It was at this time too that the idea of conducting fertilizer experiments using small, rod-row plots was conceived. This proved to be a great asset in conducting more precise experiments with greater accuracy of application and with easily observable and measurable results. Small power equipment was developed at the local level to make it possible to handle more plots with considerably less labour input. Multiple-row power seeders and power harvesters were the two main pieces of equipment that made it possible to handle a much larger volume of small plot work effectively.

During the early postwar period there was a renewed interest in research on agricultural problems that had been held in abeyance due to other government funding demands.

It was decided to take a more detailed look at the problems associated with the Gray-Wooded soils. Three special units were to be developed in Saskatchewan and Alberta, located on typical Gray-Wooded soil, to develop methods of managing these soils with respect to fertility, tillage methods, cropping practices and overall productivity. One of the units was to be located in northwestern Saskatchewan and known as the Gray-Wooded Soil Experimental Sub-Station. The original site selected was near South Makwa. Within two years, however, the owner and operator vacated the land, so a new site was located on Mr. R. Kisling's farm northeast of Loon Lake, where it operated until 2006. A second supervisor's position was approved for the Scott area, and Mr. W.B. Towill was appointed. His main responsibility was to develop the Loon Lake Sub-Station and to supervise several other illustration stations in the northern part of the district.

Early studies at Loon Lake indicated that the "Loon River loam" soil was strongly deficient in sulphur, phosphorus and nitrogen. Alfalfa forage yields were doubled and tripled with additional sulphur. While grain crops responded strongly to combinations of phosphorus and nitrogen, this very dense, low organic matter soil was, and still continues to be, a very difficult soil to handle physically.

Other illustration stations in the northern area were established at Dorintosh, Pierceland and Turtleford. These units represented a Lacustrine Gray soil, common in the Dorintosh area; a coarser textured till Gray soil at Pierceland and a degraded Black Till soil at Turtleford. The station at North Makwa was closed due to the retirement of the operator at about the time that the unit at Loon Lake was starting. Towill was responsible for these units until he was transferred to Thunder Bay in the fall of 1958.

In 1948, a station was established at Marsden, Saskatchewan, to develop methods of controlling yellow toadflax (*Linaria vulgaris* Mill.). This persistent perennial weed had been spreading steadily through a large area of very productive farm land. Marsden appeared to be in the centre of the most severely infested area. Herbicide, tillage and cropping treatments were used separately and in various combinations to determine an effective control program for this problem. Over the 12-year period that the project was active, numerous herbicides were tested and several programs of effective control were established. This was one of the first instances where the department supplied the power and equipment (except harvesting equipment) to do the job instead of relying on the operators for most of the tillage operations, and it turned out to be a very satisfactory arrangement. A similar, but smaller station was established near Cut Knife, Saskatchewan, to develop methods for controlling Canada thistle (*Cirsium arvense*).

From 1946 to 1956, the supervisors became increasingly involved in more detailed research on soil fertility, weed control, tillage and cropping practices, and perhaps less

involved in economics (cost of production) and the extension aspects of the illustration station program. Improvements in transportation and methods of communication in western Canada resulted in a decline in the demand for demonstrations and a growing recognition of the need for increased research.

In 1955, a conference of western supervisors, superintendents of experimental farms and stations; research officers involved in agronomic research at these stations; and the chiefs of the field husbandry and illustration station divisions in Ottawa, was held at Lacombe, Alberta. A review of the results indicated that some of the programs (e.g., soil fertility) on illustration stations generated more data than similar programs on the experimental farms. One result of the meeting was that, in the future, research officers at experimental farms and stations were to become more involved in planning and executing the programs carried on at the illustration stations. This marked the beginning of integration of the operation of illustration stations with that of experimental stations. In 1959 there was a major change in the Department of Agriculture organization with the formation of the "Research Branch," an amalgamation of the programs underway in the experimental farms service and the science service. In the reorganization the illustration stations were renamed "Project Farms" and became the direct responsibility of the research station or experimental farm within the area.

The research officers at Scott were responsible for the programs in the area of specialization conducted at the project farms. Keys became the research officer in charge of crop management and was responsible for coordinating the programs on the project farms. Following the change in organization and management of project farms in 1959, there was been a steady decline in the number of units remaining in operation. The role of the project farms was altered to fulfill the research needs at the station rather than to serve an extension role in the communities where they were located.

Prior to 1959, there were some 13 units supervised by Scott. In 1977, when Keys retired from the research branch, the number of units in operation had declined to five. These sites were located at Kindersley, Rosetown, Lashburn, Glaslyn and Loon Lake. At present, only a single site at Glaslyn exists on the Chris Matweow farm. The practice of holding field days at these locations as a way of demonstrating and transferring new technologies continues to the present. Over their history, the illustration stations (later project farms) had an immense impact in ensuring that relevant technologies were adopted by area farmers. At present however, farmers can access information about new technologies in a wide variety of ways including larger field days, growers meetings, extension publications and increasingly through the Internet. With these developments, it is unlikely we will see a revival of such activities.

In 1977, the many contributions of Fred Bell to agriculture in the region was recognized by his induction into the Alberta Agriculture Hall of Fame.

Taking counts to determine the effectiveness of various cultural and chemical treatments on weed growth.

Chapter Four: The Dirty Thirties

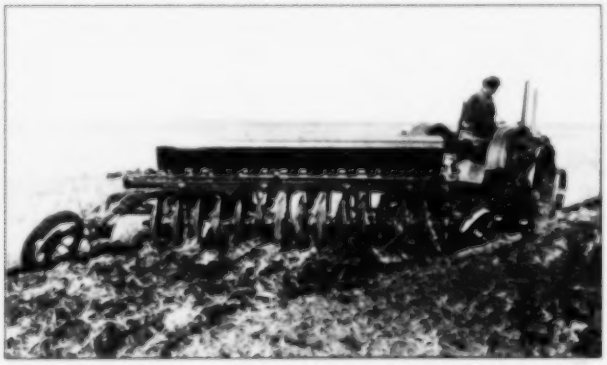
Drought, often extremely severe, characterized the 1930s. Soil drifting was frequent in many areas of the prairies and, in many instances, dramatically demonstrated that certain areas of coarse-textured soils should never have been broken and released from the prairie sod.

These drought conditions, aggravated by a severe depression and low prices for farm products, brought new problems for farmers. Consequently, the demand for experimental results in all aspects of farming increased tremendously. New demands were thus being made on the station and "attacks were started on such problems as drought, soil drifting, methods of seeding hay and pasture crops, use of phosphate fertilizers, weed control studies, pasture tests and effect of frost on dates of seeding wheat." Farmers showed a readiness to apply results which had a bearing on any of their problems, and there was a tendency for farmers to lower production costs, adopt ploughless instead of ploughed fallow, to seed certain grasses in late fall, to use phosphate fertilizer and to practice more timely tillage for weed control. It was during this period of time that the one-way disc began to replace the moldboard plow, serving, in many instances, merely to aggravate soil erosion problems.

During at least the first half of the thirties, Percheron horses formed the major source of motive power on the Scott Experimental Station. Most of these Percherons were purebred and such noted stallions as "Mel Laet 2nd" stood for service at special rates for purebred mares. By the end of the decade the improvement in farm tractors and power machinery had reduced the popularity of the horse as a source of farm power. However, even those farmers who had essentially switched to the tractor still retained a team or two of horses for small jobs around the farm and for winter use when snow conditions made it difficult, and often impossible, to use cars and tractors.

Certainly one of the major improvements in the farm tractor during the 1930s was the replacement of steel-lugs with rubber tires. This innovation reduced the rolling resistance of the tractor and accounted for a considerable saving in fuel and stress on the operator's back.

Cultivation of certain areas of light-textured soils contributed greatly to the severe soil drifting of the 1930s.



In many areas the one-way disc replaced the moldboard plow and, in many instances, created further soil erosion problems.

The main buildings at Scott in 1935.

The dual-purpose Shorthorn continued to comprise the beef herd during this period. The aim was to maintain a good beef type and to select constantly for reasonable milk production. Considerable success was achieved with such notable cows as Scott Aughlish Ada with a milk record of 4,491 kg (9,894 lb) in one lactation and Scott Prairie Rose who in seven lactation periods produced a total of 23,657 kg (52,109 lb) of milk with a butterfat content of 4%, and thus a total of 946 kg (2,084 lb) of butterfat.

Considerable experimental feeding of steers was carried on during this period. One item of particular interest to anyone who lived through the Dirty Thirties was the comparison of lamb's-quarters (*Chenopodium album* L.) silage with that of sunflower silage during the 1937-38 winter. During the 1937 growing season, rainfall was sparse until late in the season when heavy rains caused a rank growth of lamb's-quarters in many of the crops. This weed and sunflower plants were ensiled in trench silos and the feeding value of the lamb's-quarters silage was found to be equivalent to that of sunflowers.

The breeding flock of sheep had been maintained at approximately 60 females until 1936. There had been both Rambouillets and Shropshires, but a shortage of feed and pasture forced a disposal of the Shropshires in 1936 and a reduction in the Rambouillet breeding females to a total of 30 head, which was increased to 50 in 1937. Prior to 1936, it had been shown that the Rambouillets yielded more and better quality wool than did the Shropshires.

A number of feeding tests were conducted during the early 1930s with both lambs and pregnant ewes, comparing such rations as frozen wheat versus oats, oats versus barley, as well as rape pasture alone versus rape pasture plus mixed whole grain.

In 1938 the entire sheep flock was sold because of pasture limitations and the small number of farmers in the area who were interested in sheep.

The swine herd during this time was entirely of the Yorkshire breed and the average number of litters raised each year was 20 in the spring and six in the fall. Feed records show that an average of 494 kg (1,087 lb) of mixed feed was required to raise a pig from birth to market weight when one litter per year was produced, averaging seven pigs per litter. The feed for the brood sow for 12 months was included in this figure, and when two litters per year were produced the average feed per pig was reduced to 417 kg (918 lb).

Many different swine rations were tested over the years, comparing grains alone, in differing proportions, and grains fortified with various mineral supplements and fish oils. Various types of winter swine housing were also tested. Lamb's-quarters again entered into feeding trials and it was found that 2 kg (4.5 lb) of lamb's-quarters seed would replace 0.45 kg (1 lb) of grain for swine when a maximum of 20% of this particular weed seed was mixed with grain before grinding. It was pointed out, however, that to use weed seeds in this manner would seem unwise unless grain was scarce or high in price.

There was no mention of poultry in the annual report of the station for the period 1931 to 1936. However, the next annual report stated that the poultry breeding flock included

During the late thirties many crops, including sunflowers, were evaluated for silage.

Scott cow records high production.

350 to 400 chickens and a dozen turkeys. The chickens at this time were Barred Rocks. Pedigree work was continuous with this breed, leading to the development of an excellent strain that had good body size and color, with an average production of 250 eggs per year. Many feeding trials were also carried out. As a result of experimental feeding at various institutions in the late 1920s and the 1930s, chick starters as well as growing and laying concentrates had been developed. These products greatly simplified the feeding of all types of poultry and inquiries at the station for information on the feeding of poultry were greatly reduced by the end of the decade. During the late 1930s, there was a switch from home-hatching to the purchase of day-old chicks from commercial hatcheries and by the end of the 1930s, the killing and dressing of poultry for market had also become largely commercialized.

During this 10-year period, drought and soil drifting were major concerns with the cropping practices in this area of Saskatchewan. The cropping system of grain and fallow became the most prevalent among farmers. It proved to be the best form of crop insurance that the farmer had at his disposal, particularly during dry years. This system provided some crop residue cover to resist wind erosion and it fitted in well with strip-farming, which became popular in many areas of the prairies. However, trials at the Scott Experimental Station continued to show that a properly managed 3-year rotation of summerfallow-wheat-wheat was more profitable than the 2-year scheme of fallow and wheat.

In 1935, Mr. Harold Horner, who later became Deputy Minister of Agriculture for Saskatchewan, joined the staff and was given responsibility for developing a research program in crop management. A great many trials were conducted, all aimed at better management and higher yields of grain during a period of protracted drought. As a result, by the end of the thirties the deleterious effect of drought on crop development could be greatly reduced.

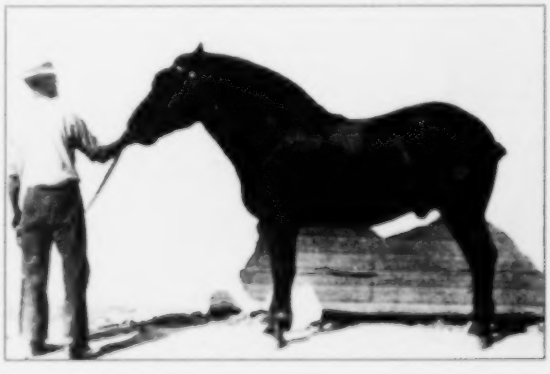
No form of grass crops in the rotations, nor ploughing down a green manure crop during a summerfallow year, was suitable during dry years. A 10 cm (4.0 in) depth of ploughing or cultivating seemed preferable to either shallower or deeper working. Experiments with packers over a 12-year period did not show any consistent difference in yields in favor of packing over harrowing for the different stages of soil preparation in which they were used. There was no mention in this report, however, of the relative effects of these two implements in increasing, or decreasing, the dangers of soil erosion by wind. The studies showed that any fall treatment that destroyed the standing stubble reduced the yield of the succeeding crop. They also demonstrated the necessity of some form of tillage of the stubble, before seeding the grain crop, if any appreciable yield was to be realized from the crop.

The value of using barnyard manure (when sufficient could be obtained) was demonstrated even during these dry years. It was also demonstrated that straw mulch was effective in preventing the commencement of soil drifting on troublesome areas. When carried to the extent of mulching an entire field with straw at the rate of 3.4 tonne/ha (1.5 ton/ac), this practice gave a yield increase the following year on spring-ploughed stubble. Much work was conducted on rates and methods of applying commercial fertilizer. It was immediately noted that the use of phosphate fertilizer

Newspaper release

Scott Cow Scores High Production

TORONTO, Oct. 10.—Among top ranking milk producers in the mature class Shorthorn cows record of performance standings reported Tuesday night by the Canadian Shorthorn Association was Scott Aughish Ada, two-year-old owned by Dominion Experimental Farm, Scott, Sask. The cow had milk output of 9,804 pounds (347 pounds butterfat) for the 365-day test period. The leader was Sprucedale Queen owned by A. J. Mitchell of Toronto with 12,139 pounds of milk (345 pounds butterfat).



Percheron horses formed the major source of motive power on the Scott Experimental Station. Most of these Percherons were purebred such as the noted stallion "Mel Laet 2nd."

resulted in more vigorous early growth of wheat, earlier maturity and an increased yield. Considerably increased yields and improved profit margins were obtained when nitrogen was also applied and 10-48-0 (which later in the decade became 11-48-0) at as low a rate as 20 kg/ha (18 lb/ac) gave excellent results over a 6-year period. These results also showed that the rate of seeding of wheat on summerfallow could be reduced from 101 to 84 kg/ha (90 to 75 lb/ac) when ammonium phosphate was used, without affecting the yield. They demonstrated that fertilizer was two to three times more effective when drilled in with the seed than it was when broadcast prior to seeding.

It was also demonstrated that the use of phosphate fertilizers on wheat resulted in stronger early root growth and consequently a lessening of damage by wireworms and certain root diseases, as well as generally giving the crop a head start on many weeds, thereby reducing yield losses due to weed competition. Weed control studies during this period were largely concerned with cultural treatments using timely and efficient tillage methods. Lamb's-quarters was the most prevalent weed, followed by wild buckwheat (*Polygonum convolvulus* L.).

During the first half of this decade Marquis wheat reigned supreme, although Garnet was used in the more northern areas because it matured a bit earlier. However, the milling quality of Garnet was not equal to that of Marquis. Red Bobs and Reward were also grown, particularly to the north and west of the station. The rust-resistant cultivars Apex and Thatcher were mentioned in 1936 as being very promising. Thatcher, in particular, was about four days earlier and yielded better than Marquis.

Victory and Banner were the two major oat cultivars. Vanguard was mentioned as a new rust-resistant oat variety, but it apparently had a low weight per unit volume.

O.A.C. 21 was the standard of malting quality barley in Canada, but it would only achieve malting grade in areas of the northwest that received somewhat more moisture than Scott. Hannchen, a 2-row barley with good kernel weight proved to be one of the best barley cultivars for competing with weeds. During this period, the very early 6-row cultivar Olli was released. At Scott it ripened 10 days earlier and yielded 22% higher than did O.A.C. 21. Because of its earliness and satisfactory yield performance this cultivar soon became promising as a weed control crop, and it was mentioned in 1936 that Olli barley proved most promising as a means of cleaning up fields that were badly infested with wild oats. It quickly became evident that malting grade barley could only be grown reliably in the moister areas farther north, and that feed barley should be grown in the drier areas.

Flax did not produce very satisfactory crops, giving comparatively low yields even when grown on summerfallow. Field peas produced satisfactory yields when grown on clean summerfallow, but gained no importance in any area served by Scott. Likewise, beans could not be recommended as a field crop under conditions prevailing at Scott.

As far as forage crops were concerned, it was stated that the prairie farmer depended upon oats for the bulk of his forage, as yields nearly always exceeded those from tame grasses.

Feeding trials for swine formed an important aspect of the animal husbandry research during the thirties.

During the thirties the poultry breeding flock included 400 Barred Rock chickens.

It was during this period that bromegrass and crested wheatgrass began to receive considerable attention, particularly because of their drought tolerance once a good stand had been obtained. One of the most effective ways of obtaining satisfactory stands of crested wheatgrass on abandoned land was to drill it directly among frost-killed weeds in late fall. G.D. Matthews supervised the seeding of crested wheatgrass over the vast area between the North and South Saskatchewan Rivers. One of the earliest projects was conducted on a section of badly eroded land near the station. Because of the deep soil blow-outs and sand drifts, only crawler tractors equipped with wide tracks could be used. The results achieved by seeding crested wheatgrass into weed patches at Scott were spectacular, and it proved its worth at illustration stations all across the southern part of Scott territory.

The Scott Experimental Station also conducted extensive experiments on grass-legume mixtures and found that the addition of alfalfa to crested wheatgrass helped both crops.

An abandoned farm northeast of Kerrobert (1935).

Tractor and V-type plough used to ridge snow and retain more moisture on the fields for subsequent crop growth.

In an effort to combat erosion, strip-farming was a recommended practice in the area.

Research results indicated that the application of phosphate fertilizer resulted in more vigorous early growth, earlier and increased yield.

Scott equipment seeding crested wheatgrass in badly eroded soil (1939).

Much of this reclaimed land eventually became the PFRA Community Pastures, which are still in operation in many areas of the prairies.

Studies aimed at management of snow were also undertaken. Snow ridging with a V-type plough proved to be the most effective. The extra moisture retained on the fields was especially beneficial to hay crops because of abundant spring moisture that the trapped snow provided.

A great deal of research work was done at Scott during this decade with all groups of horticultural crops, namely vegetables, ornamentals and fruit crops. The annual reports state that few prairie areas were blessed with an irrigation system that permitted the use of water on large fields, but most farmers could store enough water from the spring run-off in a dugout to irrigate the farm garden. A dugout was constructed adjoining the vegetable test garden in 1936 that would store enough water to irrigate 0.2 ha (0.5 ac). Commencing in 1937, this water was used via furrow irrigation to compare irrigated versus dryland production of vegetable crops with dramatic results, particularly during the extremely dry year of 1937.

Fertilizer trials were also incorporated in the vegetable trials. In general, over the years it was found that in a sheltered garden which was manured annually, irrigation alone gave the greatest increase in production with practically all vegetables. Where water was not applied, phosphate fertilizers, when applied carefully, usually increased yields.

The necessity of a good shelterbelt for the production of almost all horticultural crops in the open prairies was adequately demonstrated, and this was particularly true for the home fruit garden. Green Ash, American Elm, White Spruce and Swiss Stone Pine were mentioned during the 1930s as being particularly outstanding trees during this very trying decade. Lilacs and honeysuckles were especially reliable among the flowering shrubs. The large arboretum and the spacious landscaped grounds served as the testing grounds for scores of ornamental woody and herbaceous perennial plants. After many years of drought, a total of 95 different species, or cultivars, of trees and shrubs were reported to be in excellent condition, and another 31 to be in good condition. This proved without a doubt that the prairie dweller, even under severe drought conditions, had

The Scott Experimental Farm became a testing ground for scores of ornamental woody and herbaceous perennial plants.

a wide choice of perennial ornamental material for use in landscaping a well sheltered and well managed farmstead.

A combined perennial and annual flower border likewise demonstrated an amazingly wide choice of ornamental plants that could be successfully grown.

Experimental work on fruit demonstrated four essential requirements for successful production. They were: selection of adapted cultivars, a suitable shelterbelt, interest in their care and protection against rodents. Hundreds of cultivars were tested by the station, but only comparatively few performed sufficiently well to be recommended for hardiness, earliness and quality. Heyer 12 and Rescue were the two apple-crab cultivars that were recommended for all gardens in the area. The crabapple cultivars Adam, Amur, Anaros, Bedford, Columbia, Dolgo, Florence, Osman and Robin were also recommended. It should be noted that Rescue was selected at the Scott Station.

Plum cultivars which had performed adequately were Assiniboine, Bounty, Dandy, Mammoth, McRobert and Tecumseh, while suitable sandcherry plum cross hybrids were Brooks, Champa, Compass, Ezaptan, Heaver, Manmoor, Opata, Ruby, Sapa and Sioux.

Among the small fruits, a number of cultivars of currants and gooseberries performed fairly well under natural rainfall and did not require winter protection. Raspberries, and particularly strawberries, required at least some irrigation water in order to perform adequately. It is interesting to note that a number of the cultivars of small fruits recommended during the late 1930s are still being widely grown in prairie Canada. These include Red Lake red currant, Magnus black currant, Pixwell gooseberry, and Chief raspberry.

A relatively large apiary was operated at the Scott Experimental Station until 1936. Due to the semiarid climate at Scott, and the resulting shortage of nectar, it was decided at the end of 1936 to operate only a demonstration apiary and the number of colonies was reduced to 10. In this way, demonstrations on different phases of management could still be made and information would be available to beekeepers either by writing to, or visiting the station. The most common inquiries concerned swarm control, wintering, feeding and the handling of packaged bees.

Tom Gilson with part of the apiary (1940).

Chapter Five: World War II and the Forties

The process of reclaiming thousands of hectares of badly eroded, and often abandoned land started in 1937 and was continued until 1943. During this period a total of 17,630 ha (42,562 ac), that is, 68 sections were seeded to grasses and excellent stands were obtained. Personnel and money were both scarce during the war years and continued to be so for most of the 1940s. Gasoline was rationed and rubber tires were difficult to obtain during the war. New cars and trucks were unavailable and those on inventory during the early part of the war somehow had to be kept operating until it ended. Following the death of MacIsaac in 1942, Mr. A.G. Kusch was appointed and given responsibility for research and extension work dealing with cereal and forage crops.

Soon after the end of World War II, in addition to Mr. C.H. Keys who joined the station as supervisor of illustration stations in 1945, Mr. H.A. Friesen and Mr. E.F. Maas joined the station staff in 1946 as assistants in field husbandry and soil fertility, respectively. Mr. John Strain assumed the duties of assistant in charge of poultry in 1949 and thus relieved Van Nice of part of his former duties. One sub-professional member was taken on staff in 1943 and seven more were hired between 1945 and 1948. This extra staff made it possible to take on a considerable amount of extra research work, as well as to continue most of the projects that were already underway.

The techniques for successfully re-grassing depleted native pasture using crested wheatgrass were worked out, and one of the best was ploughing, packing and seeding in early fall.

Fertilizer trials on cereals were expanded in scope. It was already known that 22 kg/ha (20 lb/ac) of 11-48-0 hastened the maturity of wheat by about two days. However, it was determined that its use on late-seeded crops to help avoid frost damage was not warranted. It was also found that Thatcher wheat gave a better response to 11-48-0 at 22 kg/ha (20 lb/ac) than did either Apex or Marquis. Whether fertilized or not, Thatcher ranked highest in yield, while Marquis ranked lowest.

Before the advent of herbicides, there was considerable interest in the practice of neglected summerfallow. This practice was studied on some of the coarse-textured soils in the area as a means of preventing soil drifting, and entailed allowing the fallow land to lie untilled and grow up to weeds. Considerable quantities of snow were thus trapped during the winter, largely replacing the moisture that the weeds had used the previous season. The dead weeds were then burned the following spring, the land ploughed, packed and seeded. Soil moisture was lower at 0.6 to 1.2 m (2 to 4 ft), although it was higher near the surface. Consequently, this technique was never widely adopted.

The more conventional cultural methods of weed control were further studied and refined and in 1945 it was stated that for this type of weed control to be effective, four important considerations must be kept in mind and adhered to. These were:

1. *Tillage must be timely to be effective. The weeds should not be allowed to become too large.*
2. *Any tillage method on a summerfallow should kill the annual weeds in one operation; this requires that the implements be sharp and properly adjusted.*
3. *Summerfallow tillage should be done only when the weed growth requires it.*
4. *Uniform seeding of viable and weed-free seed is highly important.*

The availability of dinoseb and 2,4-D for experimental purposes in 1945 heralded the arrival of an entirely new tool in man's ageless struggle against weeds. By the end of the decade interest in these new concepts of weed control by both scientists and farmers had reached unprecedented levels. The release of these two herbicides, and the subsequent development of an ever-increasing number of new chemicals, was without doubt one of the most important, if not the most important, agricultural developments of the first half of the century. After the release of 2,4-D, and subsequent herbicides, weed control research at the Scott Experimental Station largely concerned studies dealing with the most effective use of these products.

By 1947, the rust-resistant wheat cultivar, Thatcher, had become so popular that it occupied a greater area in the province of Saskatchewan than all the other wheat cultivars combined. By the end of the decade both Marquis and Reward, which had been recommended in the 1930s, were no longer recommended and very little of either was being grown. Rescue, the first sawfly-resistant wheat was

introduced in 1946; however, one of its major failings was that it was somewhat deficient in milling and baking quality. It was during this period that a wheat and barley breeding program was initiated at Scott.

Banner and Victory oats, and particularly Banner, were being superseded by Ajax and to some extent, Exeter. O.A.C. 21 malting barley was being replaced by Montcalm in the moister areas served by Scott. New feed barley cultivars making their appearance were Titan, Plush, Warrior, Vantage, Harlan and Husky. Flax was still of very limited importance and the two recommended cultivars were Redwing and Royal. The station conducted a limited amount of flax breeding and selection work.

Up to this date only three perennial grasses, crested wheatgrass, bromegrass, and slender wheatgrass had been found suitable for the area. The two most prominent were crested wheatgrass and bromegrass. Crested wheatgrass was more suitable for the dry, open prairies while bromegrass was better in areas where moisture was more plentiful. In 1941, enough crested wheatgrass seed to fill 15 railway cars was harvested from 2,024 ha (5,000 ac) of community pasture that had been reclaimed earlier. Bromegrass seed production became a major industry in the Unity-Cut Knife area. A large seed cleaning plant was constructed at Unity to handle the annual production which averaged 1,430,000 kilograms (3,150,000 lb) during the period from 1947 to 1950.

The importance of horses on farms continued to decline during this period and projects dealing with horses essentially disappeared by 1950. Breeding and selection work with the dual-purpose Shorthorn breed of cattle was continued but declined by the early 1950s to the status of providing purebred Shorthorn cattle for experimental feeding trials.

During the Second World War experimental feeding of swine largely gave place to the production of young breeding stock for farmers who were helping to increase the quantity of "Bacon for Britain." They did prove during the war that Canadian-bred Yorkshires were equal to Swedish Yorkshires for the production of Wiltshire sides for export. After the war part of the swine breeding work at this station was associated with advanced registry work in cooperation with the "Advanced Registry Board" in Ottawa.

The temporary increase in poultry research, which commenced in 1949 when an assistant in poultry research (J. Strain) was taken on staff, was short-lived as it was decided to discontinue poultry research at Scott at the end of 1952. The horticultural projects, which had been initiated earlier, were continued in the 1940s. Mr. T. Gilson became the head gardener following the death of Allaway in 1943. The vegetable irrigation project, over a 10-year period, showed that the use of irrigation water, on the average, increased the yield of onions 25%, beets and cauliflower 30%, beans 40%, celery and turnips 60%, potatoes, tomatoes

A metal tent used to evaluate the efficacy of 2,4-D dust.

The Scott Experimental Station became widely recognized for its work in evaluating perennial forage grasses.

and parsnips 75%, cobs of sweet corn and heads of cabbage 95%, peas 120%, and cucumbers 130%. As well as the yield increases, the quality of most irrigated vegetables was also superior.

At the termination of a 5-year onion experiment it was recommended that a home gardener either start his own seedlings in the house in early March for transplants, or procure started plants from some other source to maximize the yield of large, mature bulbs that would keep all winter in proper storage.

Near the end of the decade the Scott Experimental Station commenced testing potato cultivars and seedlings as part of the national potato variety and seedling tgrials. In 1949, the two recommended potato cultivars for the area were Irish Cobbler and Warba.

The recommended list of suitable fruit cultivars and perennial ornamentals was not changed to any extent during the 1940s.

Honey production on the open prairie proved to be quite uncertain. Extreme heat and drought at the critical season, even for a short period, seriously reduced yields of honey and, in some cases, it had been necessary to resort to summer feeding in order to avoid losing the bees completely. By the end of the decade, beekeeping on the Scott Experimental Station had been reduced to three or four colonies, primarily to assure pollination of fruit and vegetable crops.

A 1940s display demonstrating the use of irrigation to improve yield and quality of vegetables.

Chapter Six: Post-War Expansion

The most notable expansion in staff and programs occurred early in the 1950s when young, newly-trained university graduates were available. Mr. William Towill, Mr. Donald Forsberg and Mr. Harry Ukrainetz were taken on staff in 1951 as assistants in charge of northern illustration stations, forage crops, and soil fertility, respectively. Mr. Donald Dabbs became horticulturist in the spring of 1952. When Friesen transferred to Lacombe in 1953, Forsberg assumed responsibility for field husbandry as well as forage crops. In 1956, Mr. Leigh Crowle joined the staff and was responsible for work with forage crops. The poultry section was closed down at the end of 1952 and Strain was transferred to Morden early in 1953. In addition to these professional employees, 16 sub-professionals were taken on strength during this decade. Mr. William Dewar retired as clerk in the fall of 1956, and Miss Hazel Grimes took over this position in the spring of 1957.

Drought, short frost-free periods and severe winters were the main climatic hazards of the area. Thus, much of the work at Scott was directed towards a search for crops (and cultivars within them) that would withstand these hazards, as well as cultural practices that would improve the reliability of these crops. To make the most efficient use of the limited moisture supply, major attention was paid to cropping methods, rotations, tillage methods, weed control and fertilizer requirements. Soil types and climate varied considerably over the large area served by the Scott Experimental Station and so additional off-station test sites were developed. By the end of the decade, 13 of these illustration stations were in operation, and a wide variety of problems were under investigation.

The frost-free period during this decade at Scott was generally sufficient to mature most crops, but in 1957 a severe frost occurred on June 11. On that date, 5.5°C of frost damaged all crops in the area, although very few had to be reseeded, with the exception of garden crops.

Within the discipline of field husbandry many of the cultural trials were continued and new ones were initiated. Of particular interest were studies of various methods of preparing summerfallow, the preseeding treatment of fallow land, the effect of different seeding methods and soil packing, as well as methods of rejuvenating root-bound bromegrass. The scope of weed control trials through the use of an increasing array of herbicides was of major importance during this particular decade.

Early shallow cultivation of summerfallow, followed by delayed seeding about 10 days later, was widely practiced as a method of weed control and resulted in substantial yield increases in some years. However, delayed seeding increased the risk of exposure to fall frosts and in some years resulted in yield reductions. As more selective herbicides became available there was a decrease in the need to practice delayed seeding in the spring.

There was a marked increase in the numbers of research projects dealing with all aspects of nutrient requirements of crops on the many soil types represented in the area served by this station. The recommendations for types of fertilizers and their rates and placement were further refined for most of the crops grown in this area, including those on the sulphur-deficient, Gray-Wooded soils of the north.

The spring wheat cultivar Lake was developed at Scott and licensed in the spring of 1954. It seemed to have promise at the time, but it had no real impact on wheat production on the prairies. Selkirk first made its appearance during this period and by 1958-59 the major spring wheat cultivars were Thatcher, Rescue, Selkirk and Chinook. The durum wheat cultivars Stewart and Ramsey were recommended in areas south of Scott.

Garry oats was the only cultivar offering good protection against the prevalent races of stem and crown rusts. Fortune, Rodney and Exeter were also suitable. Eagle was performing very well in the more northerly areas and it is interesting to note that Victory was still being recommended in the Meadow Lake area. Ajax was recommended where early maturity was especially important.

Husky barley outyielded all other cultivars at Scott and at most other localities in the area in the last half of the 1950s, but it was slightly later in maturity than the others being grown. Titan was the earliest of the cultivars tested and was recommended where earliness was desired. Of the numerous 2-row cultivars that had been tested, Hannchen was the highest yielder.

During this decade very little flax was grown in the area served by the Scott Experimental Station, although production in the more northerly areas had increased somewhat because of the introduction of earlier-maturing cultivars. Of these early cultivars, Marine and Raja were recommended. It was also noted that Redwing was susceptible to rust.

Research work with forage crops increased in magnitude, particularly during the last half of the decade. This work dealt mainly with the evaluation and management of the more important foreign and domestic forage species. An intensive collection of native Agropyron species was undertaken throughout Saskatchewan and parts of Alberta and Manitoba. Crested wheatgrass, bromegrass and intermediate wheatgrass gave the highest hay yields of any of the perennial grasses, while highest pasture yields were obtained when the stands were mainly Russian wild ryegrass.

For prairie lawns it was established that a mixture of crested wheatgrass and Russian wild ryegrass produced the best lawns under dry conditions, whereas Kentucky bluegrass was the most satisfactory for watered lawns. It is of particular interest to note that Scott was the first station to report on the unsuitability of Merion bluegrass for watered prairie lawns because of its susceptibility to disease and winter injury.

Rapeseed was becoming an increasingly important crop, particularly in the more moist parts of the northwest region served by the Scott Experimental Station. Diseases of this crop had not become a serious problem in the drier areas of western Saskatchewan, but had already caused some problems in northern areas. By the late 1950s, the most troublesome insects on this crop were cutworms, the beet webworm, diamondback moth and the red turnip beetle.

There was a considerable increase in the number of horticultural projects during the decade. Gilson retired in 1954 and Mr. Wilf Hosgood was appointed head gardener. In 1955 the Scott Station was chosen as the site for the "Potato Isolation Station" for the prairies. It became the responsibility of this station to produce stocks of potato cultivars and seedlings as nearly disease-free as possible and to distribute them to prairie research institutions that were cooperating in the national potato variety and seedling trials.

This responsibility was transferred to Morden in the early 1960s and eventually to Lethbridge after a full-time potato specialist was taken on staff at that station. Batoche and Carlton are two of the most notable potato cultivars that were eventually licensed from selections made at Scott during the time that this station was responsible for the potato project.

In 1955, Scott became the site of the "Potato Isolation Station" for the prairies.

During the 1950s the value of small plant protectors was demonstrated for many heat-loving vegetables.

It was demonstrated that 2,4-D and MCPA, applied early at relatively low rates, could be used to control many broad-leaved weeds in potatoes. Since then, a host of herbicides have been registered for use on this crop. The devastating effect of careless use of 2,4-D on tomatoes and beans was also demonstrated at Scott.

Some of the earliest trials on the Canadian prairies using plastic soil mulches and numerous types of small plant protectors to improve the performance of many heat-loving vegetables were conducted at Scott in the 1950s. It is gratifying to note that a number of the recommendations arising from these trials have become common practice, both in home gardens and by commercial growers.

During this decade the Scott Experimental Station also became a co-operator in the prairie fruit breeding program. The controlled crosses were made at Morden who sent seeds or started seedlings to the co-operators. Eventually, several thousand seedlings, mostly of apple, were grown and evaluated. Of particular note was the fact that the apple cultivar, Norland was a product of this program at Scott.

With the retirement of Van Nice in 1956 there was a considerable reduction in the number of animal husbandry projects. Work with beef cattle during this period consisted mainly of a study on post-weaning growth of Shorthorn calves. Rate of gain had become increasingly important in the beef industry, and this criterion was used at Scott in the selection of herd sires and breeding females.

From 1954 to 1957 the experimental work with pigs involved testing the crossing ability of the new Lacombe breed with Yorkshires. This was done in cooperation with the Lacombe Research Station in Alberta. The results showed that these crossbred pigs reached finished weight in less time than either of the pure breeds. In 1958, the facilities at Scott were used to increase the numbers of purebred animals of the new Lacombe breed.

With the transfer of the herdsman (J.B. Asher) to Lacombe in February 1960, all research projects at Scott relating to animal husbandry were terminated.

One selection from the prairie fruit breeding program which eventually led to the licensing of the Norland apple.

Chapter Seven: 1960-1985, A Time of Instability and Revival

By the late 1950s the Canada Department of Agriculture began an examination of the internal structure of its research program. The main research arm was the experimental farms service, but a second thrust was the rapidly expanding science service. Its employees, unlike those of the experimental farms service, were not expected to have contact with the farming public. Their mandate was to conduct in-depth research free from any restraint concerning practical applications. Since work was not to be duplicated by the two services, this fostered the perception that employees of the experimental farms service were not really research scientists.

Amalgamation was one means of solving the problem resulting from this dual structure, and rumours that this might occur were confirmed by a memorandum sent in September 1958 to the directors and superintendents of both services. The announcement became official on April 1, 1959, and the new organization was titled the "Research Branch," the large experimental farms were called "Research Stations" and the superintendents became directors. With reorganization, the division of illustration stations ceased to exist and many research stations discontinued illustration station work.

Smaller units like the Scott Experimental Station were called experimental farms. At Scott, the illustration stations became project farms and a steady decline in their numbers occurred over the next decade.

Superintendent G. D. Matthews retired in 1959 and was replaced by Mr. R.G. Savage in 1960, who was transferred from the experimental farm at Smithers, B.C. Following the appointment of superintendent Savage, several additional scientists were added to the staff and new programs initiated. Appointments in 1961-62 included: Mr. W. Rauser, Plant Physiology, Mr. T. Olthof, Horticulture and Mr. K. Cressman, Soil Chemistry.

Soon after this significant expansion in the research program at Scott, the research branch decided to phase out several of its smaller stations, including Scott. This decision had a major effect on the Scott Experimental Farm programs and on producers in northwestern Saskatchewan. By 1965, six scientists, including the superintendent, had either resigned or accepted transfers to similar positions at other locations.

A disastrous fire occurred in 1961 when the cereal building and all its contents were completely destroyed. Some of the more significant losses included a range of threshing, cleaning and weighing equipment, thousands of lines of cereals and numerous breeders' stocks of oats. Replacement funding was restricted to a few small equipment items and consequently the building was never replaced.

In 1965, Keys, the former supervisor of illustration stations, was appointed superintendent. Keys and three other professionals: H. Ukrainetz, W. Russell and L. Crowle continued to maintain an active program in weed control, crop management, soil fertility and potato breeding, both at the Scott Experimental Farm and at five project farms. By 1968, both Crowle and Ukrainetz had transferred to Saskatoon but both continued to maintain research programs at Scott. In 1970, Russell and the potato program were transferred to Morden, Manitoba. This ended an era of horticultural research which had played a major role in the agricultural development of the area for decades. In 1971, superintendent Keys was transferred to the research station at Saskatoon, from where he continued to direct the overall operations of the Scott Experimental Farm. With no resident professional staff, Scott became a sub-station of the Saskatoon Research Station.

At that time, producers, producer groups and a concerned public reacted strongly to the proposed shut-down of the only agricultural research establishment serving northwestern Saskatchewan. Their opposition was heard in Ottawa and the research branch dropped plans to phase out the Scott Experimental farm and decided to retain it as a sub-station of the Saskatoon Research Station. From 1971-77 the Scott Experimental Farm and the five project farms (Loon Lake, Glaslyn, Lashburn, Kindersley and Rosetown) operated programs in weed control, crop management, soil fertility and management, and evaluation of cereal, forage and oilseed cultivars. This research was coordinated by scientists located in Saskatoon and conducted by technical staff located at Scott.

Another fire in 1978 destroyed a building that housed much of the grain threshing and cleaning equipment used in small plot yield determination. Also lost were several pieces of field machinery and a semi trailer truck.

The building was replaced in 1979, but only key pieces of equipment and machinery were replaced.

In 1978, the Research Branch determined that coordinating research programs from a location 175 km removed was not the most effective means of meeting the branch objectives, including serving the agricultural industry in northwestern Saskatchewan. This decision was quickly followed by the appointment of Mr. K.J. Kirkland (1978) as superintendent. He was responsible for the weed control research and was located at Scott. In 1979, Mr. S.A. Brandt was appointed as agronomist with responsibility for the crop management program. He was also located at the Scott Experimental Farm.

This change in direction for the Scott Experimental Farm, combined with the soil fertility and crop evaluation research which is still coordinated from the Saskatoon Research Station, provides a wealth of information on crop production to producers across the prairies and, in particular, to those in northwestern Saskatchewan and northeastern Alberta. In 1980, a field day at the Scott Experimental farm attracted 400 producers from this region. This became a highly successful annual event and a tribute to the decision to revitalize the Scott Experimental Farm.

During 1980 to 1985 staff at the farm became highly involved in transferring new technology to area farmers. At the same time they sought input from area farmers about the pressing issues that could be addressed through research efforts at Scott. This work laid the groundwork for some highly effective technology development during the 1986 to 2010 period.

Scott Experimental Farm (1984).

Chapter Eight: 1986-2010, The Conservation Tillage Era

The period 1986 to 2010 was an era of relative stability, and productivity at the farm. At the start of this era, research was supervised by four scientists, Kirkland and Brandt at Scott and Crowle and Ukrainetz at Saskatoon. All of the scientists had been at Scott for more than five years so projects were maturing and becoming more productive. Scott was also in the midst of replacing most of the field and laboratory equipment which had long ago outlived its usefulness. External funding provided extra resources for research, and several new employees were brought in on short-term agreements. There were some challenges as well. Budget cuts in 1995 reduced staff by four persons and budget uncertainties during the latter part of the era made planning difficult.

Prior to 1986, there was general recognition that soil productivity on the prairies was declining at an alarming rate. As was the case in the 1930s, light textured soils were most affected. However even the most productive soils were seriously affected by soil organic matter loss, erosion and salinity. Failure to address this issue would seriously compromise agriculture in the region. At the same time crop prices were declining and input costs were rising. The challenge was to develop cost effective soil conserving practices. Meeting this challenge led to the development and adoption of conservation tillage, the most significant accomplishment during this era.

Soil degradation was rooted in the widespread practice of summerfallow along with extensive use of tillage. These practices destroyed the protective cover needed to prevent erosion. They also promoted rapid decomposition of soil organic matter and excess water leached salts that caused soil salinity. The approach at Scott was to focus on practices that left more protective residues on the soil surface while enhancing the economics of crop production systems. Research was directed to developing crop management, weed management and fertility practices that would facilitate production of crops with very little tillage or summerfallow. This change in emphasis resulted in closer collaboration not only between scientists, but also with farmers and between levels of government.

The past 30 years also saw major changes in how research was done. The development of small plot combines vastly increased the number of treatments that could be evaluated in the field. These machines separated grain from straw in the field, eliminating the need for hand cutting and transport of grain and straw from the field to drying sheds followed by threshing with a stationery thresher which was slow and labour intensive. The rapid increase in numbers of field trials during the early 1980s tested staff's capacity to analyze data, but was soon resolved with the introduction of personal computers. An example of the impact of computers is that in 1980, it took one technician three months to analyze the

Field plots show current cultivar work and volume of data to collect.

past year of crop rotation data on a manual calculator, and three months to check this work. Ten years later, the full 30 years of crop rotation data were analyzed on a computer in under one minute!

This era also saw a big increase in external funding of research which accounted for up to 40% of the budget. Agricultural chemical companies provided significant support for weed management research early in the era. Their contributions declined as consolidation in the industry resulted in fewer companies. During 1985-88 the Canada/Saskatchewan Economic and Regional Development Agreement (ERDA) made major contributions to research on Canada Prairie Spring wheat. This agreement also supported development of practices to enhance soil quality, and a smaller project on winter wheat. Subsequent funding for soil conservation research came from the federally funded "Environmental Sustainability Initiative" during 1990-93. Other projects that were externally funded dealt with chemical crop desiccation, pulse crop inoculants and fall seeding of canola. Funding from the Western Grain Research Foundation wheat and barley checkoff fund doubled cultivar evaluation activity during 1997-2004. This work involved evaluation of advanced breeder lines of wheat and barley.

During the 1990s, environmental concerns became more important. These ranged from pollution issues with pesticides and fertilizers to the impact of agriculture on biodiversity and greenhouse gasses. The federal "Green Plan" funded several significant projects during 1994-97. The most significant of these was the "Alternative Cropping Study" which has continued to the present. Thus by the end of this era, many studies had a strong environmental component, or were being evaluated for environmental impact.

Prior to this era, research was organized according to traditional scientific disciplines of weed science, crop management, soil science and plant breeding. During the 1990s, the nature of research became more complex with the development of multi-disciplinary studies like the alternative cropping study. Many of the studies conducted after 2000 are multi-disciplinary, multi-site and multi-year research projects with funding support often coming from more than one level of government and several industry partners. These changes and greater cooperation between levels of government greatly influenced how the farm functioned by the end of this era.

In 1996 the federal and provincial governments began a cooperative agreement that saw one provincial employee (E. Johnson) working at the farm 50% of the time. This proved a very effective way to ensure transfer of new technologies and continues to the present. From 1997 to 2002, the farm participated as a "Spoke Site" in the specialized crop area of the Canada-Saskatchewan Agri-Food Innovation Fund. The objective of the spoke program was to find solutions to agronomic and crop protection problems in specialty crop production and to demonstrate specialized crop production technologies to local producers at regional applied research sites. Since 2003, the farm has participated as an Agri-ARM site with provincial government support. This led to development of a farmer group – the Western Applied Research Corporation (WARC) – to facilitate external funding of projects and provide guidance for research and extension activities.

It is interesting to note that since 2000, the farm has been involved in organic research. The Scott Research Farm has also been involved in research on genetically modified canola and wheat. Some questioned how this could be done without creating a conflict of interest. However staff contended that being opposed to researching one or the other presented a greater conflict, because unbiased science is based on discovery of merits of technology rather than pre-judging technology.

Two other significant changes involve the initiation of the Minor Use Pesticide (MUP) program, and the Prairie Canola Agronomic Research Program (PCARP). The Minor Use Pesticide program was established in 2002 and is a joint initiative of Agriculture and Agri-Food Canada and Health Canada. Under this national program Scott became one of nine federal minor use pesticide research sites in Canada with responsibility for the prairie provinces. Scott is a logical location for a prairie-wide program since it is located close to the geographical center of the three prairie provinces. A "minor use" pesticide refers to crop-protection products (fungicides, insecticides, and herbicides) used on low acreage crops, or where pest control is only needed on

a small portion of the overall crop acreage. These pesticides are usually used in such small quantities that manufacturers find the sales potential is not sufficient for them to seek registration in Canada. The PCARP program began in 2009 and is a program that supports development of prairie wide canola agronomic projects. It is supported by the three prairie Canola Development Commissions. Multi-site and multi-year integrated canola studies will be conducted to help meet canola production targets set for 2015.

The annual Scott field day has been held since 1980, and continues to draw over 200 visitors to the farm. In addition, the farm hosts field tours for groups of organic farmers, extension specialists, weed scientists and certified crop advisors on a periodic basis. Other technology transfer activities include speaking at numerous meetings sponsored by commodity organizations, agribusiness, farm groups and other levels of government as well as walk in, telephone and internet inquiries. Staff communicates with several thousand farmers each year through these varied means.

In 1996, Kirkland was made responsible for both the Scott and Melfort research farms, a responsibility he held until retiring in 2000. At that time, Brandt became the section head responsible for Scott and Johnson was hired as a federal employee to lead the weed management research. In 2008, Brandt retired and Johnson currently is the officer-in-charge for the Scott Research Farm. Present staff consists of a minor use biologist (D. Ulrich), an administrator (T. Sittler), a maintenance technician (M. McKenzie) and eight technicians. The technicians are responsible for weed management (H. Schell and C. Gampe), soil and crop management (L. Sproule and D. Gerein), cultivar evaluation (S. Dueck and R. Koenig) and crop production (L. Nielsen and A. Kapiniak).

A large crowd attends the 2006 Scott Field Day.

Weed Biology and Control

Weed control methods, both chemical and cultural, have always been a major concern to weed scientists at Scott. Friesen (1946-1953) was instrumental in developing several methods to control weeds by cultural means. Post-seeding tillage, timeliness of summerfallow tillage, band application of phosphate fertilizers and adjustment of seeding rates all became common practices in the struggle to overcome weeds. The development of effective uses for 2,4-D to control annual and winter annual weeds were also extensively investigated during Friesen's tenure at Scott.

This work was continued and expanded by Forsberg (1951-1962). He demonstrated that plant growth stage was critical when applying 2,4-D to cereals, and that oats were considerably more tolerant to the amine than to the ester formulations of 2,4-D. Forsberg's research also showed that TCA could be used to control quackgrass, and that timely tillage following application permitted rates to be reduced by one-third.

Keys (1945-1977), assumed the responsibility for weed control following Forsberg's resignation. Keys made many contributions to the rapidly expanding science of weed control. The most notable of these were an understanding of the biology and control of wild buckwheat and Canada thistle, and the development of methodology to determine picloram residues in prairie soils. His research on control methods for perennial weeds such as toadflax and Canada thistle included studies on cultural methods (such as tillage), systemic herbicides, and the integration of cultural plus chemical methods.

Results obtained in the continuing study of herbicides by Kirkland (1978-1999) have contributed to recommendations for the use of many registered products. His research has also contributed to national recommendations for the use of tank mixtures to control broad-spectrum weed problems in cereals and oilseeds, the application of metribuzin and cyanazine to control cruciferous weeds in triazine-tolerant canola, and the determination of the effects of residual herbicides on succeeding crops. Kirkland initiated the first research on herbicide tolerance of the wheat cultivar HY320. This information was instrumental in developing control recommendations when HY320 was licensed in 1985. He also demonstrated the effect of water quality and the impact of carrier volume on the performance of many herbicides. Research on rates and timing of application led to better understanding of factors that influenced the efficacy of wild oat herbicides. Collaborative work between Kirkland and Johnson demonstrated the importance of early spring seeding of canola.

Johnson has continued weed control research since 2001. A number of mechanical weed control studies conducted by Johnson have led to recommendations for organic producers. Other research has illustrated that sequential applications of residual herbicides, under certain conditions, can result in additive injury to rotational crops. Most recently, research has focussed on developing weed management strategies in pulse and specialty crops.

Soil Management and Fertility

Experimental work with commercial fertilizers was begun at Scott in 1918 when nitrogen, potassium and phosphorous fertilizers were applied to corn and wheat. Only phosphate fertilizers increased wheat yields in these early tests. Subsequent tests confirmed the early findings to hold true for oats and barley as well.

Research conducted by MacIsaac (1928-1942) showed that a combination of nitrogen and phosphate fertilizer produced increased wheat yields and that seeding rates could be reduced without loss of yield. His work also showed that phosphate fertilizer was two to three times as effective when drilled in with the seed, compared with broadcasting at the same rate prior to seeding.

Friesen (1946-1953) continued this work and was able to demonstrate that phosphate fertilizer assisted in hastening the maturity of wheat. He also reported that the formulation of phosphate fertilizer used was a significant factor in the level of wheat yield increase obtained. On the basis of equal rates, yield increases with ammonium phosphate (11-48-0) were at least 135 kg/ha (120 lb/ac) higher than with other formulations.

Ukrainetz (1951-1992) assumed the responsibility for soil-related studies and made numerous significant contributions to crop production recommendations. His work has demonstrated the importance of phosphate placement in relation to the seed. Ukrainetz's pioneer research on liming

acid soils in northwestern Saskatchewan led to increased investigation and determination of soil acidity and its effect on crop production in Saskatchewan. He also investigated the effect of sulphur deficiencies on the growth and development of canola over several soil types. These results contributed to provincial recommendations for the use of sulphur on canola. Studies on form, timing and placement of nitrogen fertilizer for crops grown on stubble made several significant contributions for improving nitrogen fertilizer efficiency. These included setting of maximum safe rates for seed placement, benefits of sidebanding at the time of seeding, and revelation that urea, ammonium nitrate and anhydrous ammonia were equally effective provided they were appropriately placed. Improved fertilizer placement played a key role in developing the package of technologies needed to ensure adoption of conservation tillage.

After 41 years of work at Scott, Ukraintez retired in 1992. From 1993 until 1995, soil fertility work was supervised by Beckie (located at Melfort), who made significant contribution to understanding the nitrogen contributions of pulse crops to succeeding grain crops. From 1995 to 2008, the responsibility for fertility research at Scott at a much reduced scale was supervised by Brandt. This work was integrated with and is reported along with crop management research.

Crop Cultivar - Evaluation and Development

During the early years, the Scott Experimental Station introduced and demonstrated the adaptation of numerous cereals, forage, fruit, vegetable, ornamental and shelterbelt species to northwestern Saskatchewan.

Over the years, several cultivars have been developed or selected at the station, and some of these are still widely grown. Rescue apple-crab was selected at the Scott Station during the 1930s and still maintains a prominent place in most farm and urban orchards. The apple cultivar Norland, released by the Morden Research Station in 1980, was originally selected at Scott, prior to the transfer of the horticultural programs to Morden.

In 1955, Scott was selected as the site for the potato isolation station for the prairies. During the decade that this program was located at Scott, two notable potato cultivars, Batoche and Carlton, were selected and eventually licensed.

The cereal breeding program, initiated during the 1940s, released the spring wheat cultivar Lake (developed by Kusch) in 1954. It appeared to have considerable promise at the time and was widely grown in the Scott area, but never did make a major impact on wheat production on the prairies.

Forage research at Scott was concentrated on the selection of hardy, drought-resistant, saline tolerant strains and species. Considerable success had been achieved with crested wheatgrass, wild ryegrass, bromegrass and alfalfa during the thirties and forties. However, one of the major successes occurred in 1970 with the licensing of the slender wheatgrass cultivar Revenue developed by Crowle.

During the period 1970 to present, no breeding programs were conducted at the Scott Research Station. However, variety evaluation of grain crops remained a vital part of the research work carried on at Scott and project farms which numbered four in 1970, but declined to two by the late 1980s, and one by 2006. National and western cooperative tests are conducted annually on licensed and developmental cultivars of HRS, CPS, Hard White, Soft White, Extra Strong and Durum wheats, 2- and 6-row malting and feed barleys, oat, *Brassica rapa* and *B. napus* canolas, mustard, pea, lentil, chickpea and sunflowers. The data from these trials contribute to the evaluation of new cultivars proposed for licensing, and also assists in determining the relative merits of each cultivar at various locations in northwestern Saskatchewan. In addition, advanced breeding lines of canola are being evaluated. The cultivar evaluation program made an additional contribution to the development of wheat and barley cultivars by evaluating several thousand advanced breeding lines of the two crops during 1996 to 2004.

Crop Management and Rotations

Crop rotation experiments were initiated on the Scott Experimental Station in 1912 by Everest. One experiment, "Rotation C," a 3-year wheat-wheat-fallow rotation, is still conducted on the same location. Tinline (1915-1923) and V. Matthews (1924-1928) expanded the rotation work to include longer-term rotations and to determine the effectiveness of forages in cereal rotations.

During the 1930s, and early 1940s, D. Matthews (1928-1959) made numerous contributions toward the

management of various crop and soil factors. He was instrumental in expanding studies on rotation and crop management techniques via an extensive network of illustration stations located throughout the northwest. Matthew's work in the reclamation of thousands of hectares of severely eroded land towards the end of the Dirty Thirties is widely recognized. His methods of seeding and establishing crested wheatgrass, soil ridging to halt and prevent erosion, and snow ridging for moisture retention on forage and cropland all contributed significantly to the revitalization of much of western Saskatchewan's highly eroded and abandoned agricultural land.

From 1946-1953, Friesen was responsible for the crop management (field husbandry) research. His major contributions included recommendations on different methods of summerfallowing to prevent erosion and preserve moisture, cover crops on fallow, and preparation of stubble land for seeding.

Crop management research was continued (1964-1977) by Keys, who carried out extensive investigations on moisture conservation and utilization, crop sequences on Dark Brown and Gray-Wooded soils, and combined cultural and chemical treatments for crop production. His work in moisture conservation showed that snow could be trapped on crop land by various means, and the additional snow-melt water utilized by succeeding crops. He also demonstrated the value of sweetclover and alfalfa in crop rotations on Gray-Wooded soils.

Crop management research to evaluate methods of dealing with soil degradation has been conducted by Brandt (1979 - present). Cropping practices such as zero or minimum tillage, extended rotations, and use of pulse and other legume crops, have been evaluated. These studies have demonstrated that summerfallowing Gray-Wooded soils conserves only minimal amounts of additional moisture and that continuous cropping on such soils is not only feasible but essential to preserve soil quality. On Dark Brown soils moisture is a more important factor limiting yields in extended rotations. However, his work has also shown that summerfallowing on these soils should be reduced. He has also demonstrated that careful management is required to get maximum returns from the relatively high levels of inputs required when fallowing is reduced or eliminated.

A large interdisciplinary study called the "Alternative Cropping Study" was initiated in 1994. It involves 15 to 20 scientists from across the region, and is used as a resource to study how cropping affects a broad range of agronomic, soil, pest economic, energy, environmental and biodiversity factors. This type of study is essential if we are to continue to develop the capacity to address agricultural issues in the region. It is expected to continue beyond 2010, and has already received national and international recognition.

Harvesting saskatoon berries in 2008.

Minor Use Pesticide

The objectives of the "Minor Use Pesticide Program" are to provide benefits to Canadian producers, the environment and consumers by making reduced-risk pesticide products more readily available and ensuring Canadian producers have access to new pest-management technologies to improve their competitiveness domestically and internationally. The prairies are typically thought of as vast fields of wheat and canola. These are important crops but the prairie provinces are highly diversified when it comes to field crop production. Since 2002, the minor use program at Scott has grown over 50 different crop types in the process of evaluating 67 different pesticide products with crop groups consisting of grasses for seed and forage production, legume, herb and spice, oil seed, small fruits and vegetables. With the horticulture program that was phased out of Scott in the late 1950s the last two crop groups our proof positive that 'what goes around comes around'.

The Conservation Tillage Story

By the early 1980s, studies at Scott and other prairie locations indicated that cropping without tillage or summerfallow was technically feasible, but making it economically viable was a challenge. Crop yields were more variable and costs were higher. This reflected variable precipitation, inadequate seed and fertilizer placement and increased risk of weeds and disease. Conservation tillage or "No-Till" provided the solution. Its development reflects the contributions of many scientists, farmers, agribusinesses and extension specialists in which the Scott Research Farm played a major role.

Continuous wheat studies in the 1980s revealed that adequate fertility and weed control were essential to take advantage of improved moisture storage from tall standing stubble. Crop rotation studies during the 1980s established that diverse rotations of cereal, oilseed and pulse crops were essential in successful no-till continuous cropping systems. Yield was typically higher on stubble of another crop type than on stubble of the same crop. This was due partly to reduced disease, but it also allowed for more diverse weed control strategies that improved weed control.

Other studies at Scott revealed that some granular herbicides were effective when surface applied without tillage. Likely the biggest weed control advances came with the herbicide Roundup (glyphosate), which was the key herbicide needed to replace tillage. Its effectiveness could be enhanced by using better quality water and/or lower carrier volumes, and application rates could be reduced with timely applications. Roundup could also be very effective for perennial weed control if applied before or shortly after harvest. In 1988, the first North American field trials with Roundup Ready canola were conducted at Scott. The subsequent licensing of improved cultivars of Roundup Ready canola further enhanced weed control in diverse rotations.

Increased breeding activity in oilseed and pulse crops increased numbers of candidate cultivars for evaluation in the region. The cultivar evaluation program at Scott ensured that growers had the information needed to make informed cultivar choices as they adopted diverse rotations.

Soil nutrient cycling was affected by tillage and summerfallow. Their elimination required that more fertilizer be used and placed without tillage for incorporation. Fertility research in the region identified risks associated with placing large quantities of fertilizer with the seed, but also indicated that having some near or with seed was often beneficial. Benefits of banding over broadcasting were established and further enhanced by studies showing that banding near the seed-row was highly efficient. Other research dealt with understanding differences in crop nutritional requirements so that fertilizer practices could be tailored to each crop in diverse rotations. These included recognizing the high sulfur requirements of canola, and the ability of nitrogen fixing nodules on pea and lentil to supply all the nitrogen needed by these crops. Further advancements were made in developing practices to match fertilizer applications to varying moisture between years, and to varying nutrient supplies from soil in different areas of fields.

Research with seed placement equipment at Scott was limited, but equipment development by others was an essential element in the combination of technologies that make up conservation tillage and no-till agriculture. Evidence of the uptake of these technologies abounds.

Summerfallow area has declined by more than 60%, while production of oilseed and pulse crops has doubled or tripled since 1980. Conservation tillage is used on more than 70% of cropland in the prairie region, and no-till is used on more than 40%.

The test of these technologies occurred during the severe prairie drought of 2001-03, which was aggravated by a heavy grasshopper infestation. Conditions in many regions were at least as dry as any time including the Dirty Thirties, and grasshoppers ate most of what little crop grew. Dust storms were non-existent and wind erosion was restricted to isolated fields where this technology was not adopted. Conservation tillage was recognized by a science award to leaders in sustainable development from the five national science departments of agriculture, environment, fisheries, natural resources and health in 2003, shared by scientists in the region including Brandt at Scott. Indicators that this is world class science came from requests for Brandt to provide training to adopt principles of conservation tillage in Ukraine, Russia and Kazakhstan in 2005 and in China in 2008. The numerous contributions by Kirkland in the areas of weed management and conservation tillage were recognized by his induction into the Saskatchewan Agricultural Hall of Fame in 2002.

Summary

Despite its location and size, the Scott Research Farm is internationally renowned for its work on reduced pesticide usage, crop rotations and the many other achievements listed above; though locally, the Scott Research Farm is most recognized for its extension activities like field days.

No matter how one looks at it, Scott will continue to contribute to world class science. The work done at Scott is an ongoing testament to creativity and dedication of past and present staff.

Seeding methods have come a long way since the early days at Scott.

Appendix A

Illustration stations, experimental sub-stations and project farms supervised from the Scott Station 1915-1985

Operators	Location
Halpenny Bros.	Madison
Dr. S.E. Shaw	Biggar
Hugh Hill	Lloydminster
Walter Tait - John Tait	Meota
W.A. Roberts	Zealandia
C.H. Snider	Guernsey
Robert Simpson	
C. Heise	Kindersley
Robert Brumwell	
A. Brumwell	
R. Brumwell	Loverna
J.B. Godbout	Marcelin
Martin Gran	Meadow Lake
Harry Eagle	Spruce Lake
H.A. Last	Tisdale
Hector Therrien	St. Paul, Alberta
Fred McIntyre	Meanook, Alberta
G.C. Boyd	Wainwright, Alberta
J.C. Grant	Glenbush
G.F. Pals	Castor, Alberta
E.A. Pitman	Chauvin, Alberta
C.A. Fawcett & Sons	Consort, Alberta
Henry Hudek	
P. Lommer	Hafford
H.J. Larcombe	Lens
G. L. Endicott	Paddockwood

Operators	Location
A.M. McMillan	Juniata
J.H. Macey	
P.H. Macey	Rosetown
J.W. Ward	Birch Hills
H.M. Clark	Chelan
E.A. Lee	Glaslyn
G.E. Nichols	Loon Lake
W-0. Willoughby	Parkside
E.M. Bates	Pierceland
F.P. Meyers	Weirdale
P. Tornquist	White Fox
N.R. Stewart	Dunblane
Ed Masson	Metiskow, Alberta
H.M. Kennedy	Conquest
S. Wood - D. Ward	Glaslyn
I. Bowes	North Makwa
J. Kopp	South Makwa
J. Spreitzer	Dorintosh
R. Kisling - W. Kisling	Loon Lake
S. Baker	Pierceland
E & E Bloom	Turtleford
Geo. Jones & Son	Marsden
C. Brocklebank	Cut Knife
G. Barr	Mervin
H. Klinger - G. Perry	Lashburn
C. Matweow	Glaslyn

Appendix B

Employee List

Employees who are now in full-time positions or who have worked for two years or more at the Scott Experimental Farm.

Superintendents (Officer-In-Charge)	
R.E. Everest	1911-1914
M.J. Tinline	1915-1924
V. Matthews	1924-1928
G.D. Matthews	1928-1959
R.G. Savage	1960-1964
C.H. Keys	1964-1977
K.J. Kirkland	1978-1999
S.A. Brandt	1999-2008
E.N. Johnson	2008-present

Professional Staff	
D. Anderson	H.A. Friesen
R.E. Everest	G. Howat
M.J. Tinline	J.H. Strain
V. Matthews	W.B. Towill
E. Van Nice	D.E. Forsberg
G.D. Matthews	H. Ukrainetz
F.M. MacIsaac	D.H. Dabbs
N.F. Bell	W.L. Crowle
H. Horner	R.G. Savage
O. Wyler	W. Rauser
R.H. Anderson	K. Cressman
T. Townley-Smith	T. Olthof
E. Wilton	W.A. Russell
A.G. Kusch	K.J. Kirkland
C.H. Keys	S.A. Brandt
E.F. Maas	D. Ulrich
E.N. Johnson	

Office and Clerical Staff	
S. Reynolds	H. Grimes
W.A. Dewar	L. Walkowski
L. Forbstier	M. Dobransky (Schille)
Mrs. Jardine	S. Mills
B. Young	J. Miedzielcowski
B. Rouse	H. Clements
M. Ramsay	A. Bevin
D. Hughes	K. Robson
D. Smith	L. Hall
J. Parry	R.J. Peters
E. Larmour (Grill)	A. Wannop
S. Wagner	T. Sittler

Technical and Support Staff	
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G. Prost	J. Trautman
C.E. Love	O.C. Jackson
H. McCallum	P. Schmidt
J. Allaway	B.F. McEachern
F. Rouse	J. Senger
C.W. Smith	V. Glatt
J. Pschenitschnig	M. Gerein
R. Franks	G. Gerein
L. Wilson	R. Robbins
T. Gilson	M. Reiter
L. Loewen	W. Reiter
J. Lawrenson	H. Schwab
J. Risling	L. Locheed
G. Morrison	A. Heitt
M. Walyer	R.L. Carr
J. Walyer	P. Salewski
W. Downey	O. Beisel
J. Mahonik	H. Potapinski
R. Waldo	H. Schell
H.J. Nadon	J.F. Fahl
W. Davis	W. Young
E. Roadhouse	J. Hall

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H. Williams	M. Oxman
J.B. Asher	P. Abercrombe
H. Tellier	F. Abercrombe
J. Strain	C. Pschenitschnig
J. Coyle	J. Lawrence
K. Kutschera	W. Harrison
J.L. Fahl	R.W. Drimmie
T. Hamilton	G. Clark
W.O. Hosgood	J. Huber
C. Franke	L. Sproule
A. Dorward	D. Gerein
J. Diebert	J. Nordhagen
F. Huber	C. Arvidsson
D. Andrashewski	S. Dueck
M. Pernitski	T. Karstens
L. Nielsen	M. McKenzie
I. Usselman	B. Glatt
C. Gampe	R. Koenig
A. Kapiniak	M. Nielsen
M. Wagner	A. Gerein
B. Hrynewich	G. Ford
R. Gerein	

Conservation Tillage Has Virtually Eliminated Prairie Dust Storms

During the prairie drought of 2001-2003 conservation till fields did not erode; preventing soil degradation and improving air and water quality for all Canadians.